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September 6, 2016

Via US Mail and E-Mail

Attn: Harbor Comments
U.S. EPA, 805 SW Broadway, Suite 500
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Subject: Comments from the RM11E Group on the Portland Harbor Superfund Site Proposed Plan and Feasibility Study

Dear EPA Region 10:

The River Mile 11 East Group (RM11E Group)¹ is providing the following comments on the Proposed Plan (PP) and Feasibility Study (FS) that were issued by the U.S. Environmental Protection Agency (EPA) for the Portland Harbor Superfund Site (PHSS) on June 8, 2016. The comments build upon those the RM11E Group provided to EPA for transmittal to the National Remedy Review Board (NRRB) and the Contaminated Sediments Technical Advisory Group (CSTAG) (collectively, the Boards) in October 2015. The RM11E Group's comments are based primarily on the Supplemental Remedial Investigation and Feasibility Study (Supplemental RI/FS) work that has been and continues to be conducted by the RM11E Group under the 2013 Administrative Settlement Agreement and Order on Consent (AOC) for Supplemental RI/FS Work with EPA (RM11E AOC).² Thank you in advance for considering these comments as you develop the Record of Decision (ROD).

Introduction

Since 2013, the RM11E Group has been working with EPA to develop pre-ROD supplemental RI/FS data to facilitate the selection and design of a final remedy at the RM11E Project Area. In 2013 and 2014, the RM11E Group completed a significant amount of additional sampling required by the RM11E AOC.³ The RM11E Group also conducted various engineering evaluations to identify implementation issues that will affect remedy selection and design in the RM11E area.⁴ The performance of these investigations places the RM11E Group in the unique

¹ The RM11E Group consists of Cargill, Inc., CBS Corporation, the City of Portland, DIL Trust, Glacier Northwest, Inc. and PacifiCorp.

² The RM11E Group members recognize that several other parties have already submitted or will be submitting comments to EPA on the Proposed Plan (PP) and Feasibility Study (FS). The RM11E parties reserve the right to rely on any points raised by other commenters on the PP and FS.

³ The majority of the additional sampling is reported in the September 2014 Final Supplemental Remedial Investigation/Feasibility Study Field Sampling and Data Report.

⁴ The implementability issues are presented in the July 2015 Draft Implementability Study Report (RM11E ISR).

position of being in one of the few geographical areas within the PHSS where data density is high and factors directly impacting remedial design (RD) are well known. As a result of this work, the RM11E Group is well suited to provide comments to EPA on the FS and PP based on a more thorough understanding of this portion of the site.

As you know, the RM11E supplemental sediment data were not included in the PHSS database used to prepare EPA's FS or PP. As a result, the FS and PP do not accurately reflect current conditions at RM11E. Design factors that were identified by the RM11E Group as part of the RM11E Implementability Study Report (Draft, dated July 2015) (the "RM11E ISR") prepared under the AOC were also not incorporated into the FS or PP. The results of the RM11E ISR demonstrate conflicts between the technology assignment decision trees in EPA's FS and site constraints that limit implementability of those technologies in the RM11E area. These site constraints at RM11E (which may arise at other locations within the PHSS), should guide the drafting of the ROD to provide flexibility in technology assignments during remedial design.

Although data inclusion, implementability constraints, and the need for flexibility remain key issues of concern, the RM11E Group also is concerned that (1) several Sitewide assumptions utilized in the FS and PP are overly simplified, and (2) as a result, the cost and duration for performance of the Alternative I remedy in the PP are both significantly underestimated, which is inconsistent with the NCP. The RM11E Group has identified the following significant issues in the PP and FS that EPA needs to address in development of the ROD.

1. Critical site factors that affect remedy selection, design, cost, and duration must be considered
2. The remedy selection process must provide for flexibility in technology selection and implementation
3. Data collected as part of the supplemental RI/FS must be used when selecting a remedy
4. Attainable preliminary remediation goals (PRGs) must be set and exit strategies defined
5. Cost estimates are unjustifiably low and must be updated
6. The Sitewide conceptual site model is oversimplified to the point of inaccuracy at RM11E
7. Administrative options for remedial design/remedial action (RD/RA) implementation should be flexible and identified

These issues are discussed in the following sections.

1. Critical Site Factors that Affect Remedy Selection, Design, Cost, and Duration Must Be Considered

The RM11E ISR provides an initial assessment of how the current site configuration (e.g., bank slope/stability and structures), human activities (e.g., navigation and commerce), and river dynamics will impact the selection and design of a remedy for the RM11E area. Based on a series of engineering evaluations, the ISR identified 10 physical conditions and site activities, referred to as "site factors," that have a high potential to impact RD/RA at RM11E. Addressing these site factors will be critical to selecting and designing an implementable and cost-effective

remedy for RM11E. These 10 high-ranked site factors, their impact on potential RAs, and recommendations for addressing them in remedial selection and design, are summarized in Chapter 10 of the RM11E ISR and shown on the attached ISR figures:

1. Facility Operations (Figure 9.1)
2. Navigation Clearance (Figure 9.2)
3. Construction Access (Figure 9.2)
4. Submarine Cable Crossing (Figure 9.2)
5. Groups of Vertical Pile Remnants (Figure 9.3)
6. Large Undifferentiated Debris (Figure 9.3)
7. Oversteepened Slopes (Figure 9.4)
8. Structure Stability and Capacity (Figure 9.1)
9. Vessel Propeller Wash (Figure 9.5)
10. Wave Action (Figure 9.5)

The decision tree conceptual technology assignments for the RM11E area that are presented in the FS and PP are overly simplistic and do not take into consideration (and in some cases are directly contrary to) many site factors identified in the ISR. The 10 site factors identified in the RM11E ISR have significant impacts on the “intermediate” and “shallow” areas, complicating the use of EPA’s conceptual presumptive remedial technologies in these parts of the RM11E area. For example, the PP has assigned dredging as the remedial technology throughout much of the shallow/nearshore areas (PP Figure 10c and Figure 19f) but the presence of oversteepened slopes, structural stability issues, a submarine cable crossing, remnant piling fields, and large urban debris will make near shore dredging challenging, if not impossible.

To facilitate EPA’s understanding of these critical site factors, the RM11E Group offers the following examples and attached ISR Figures, which together illustrate the complexity of the RM11E area and highlight the site factors that must be considered when selecting a remedy.

- Underwater Cables, Docks, Steep Slopes Affect Technology Assignments. There is a significant risk that the underwater utility cables and operating docks within RM11E could be damaged or destroyed by the technologies assigned in the PP. For example, the PP calls for dredging where active remediation is required in the navigation channel and in designated future maintenance dredge (FMD) areas (PP Figure 10a and 19f). At RM11E, however, this would mean dredging in the same location as buried underwater cables that supply electricity to downtown Portland (see ISR Figure 9.2). While dredging is likely not implementable over the buried cables as they near the banks, there may also be limitations on the ability to cap over the underwater cables due to the resulting impingement on navigational depth (ISR Section 10.2.4.). Similarly, several active commercial docks within the RM11E area are on steep slopes that already have a high degree of potential instability (see ISR Figure 9.4). Portions of these operating dock structures may also be inaccessible for purposes of implementing a variety of active RA measures (see ISR Figure 9.2). The PP’s conceptual presumptive remedies of dredging and/or capping under or around such docks would need to

be modified given site-specific circumstances that are not conducive to the implementation of such remedies (ISR Section 10.2.8).

- Shoreline and Bank Stability Limit Remedial Options. The geotechnical characteristics and submarine conditions of RM11E will limit application of some of the current PP technology assignments in the RM11E area. Assigning technologies to the RM11E area according to the decision tree outlined in the PP could result in significant shoreline and bank collapse and create upland structure instability. The following two examples pertain to the conceptual discussions in the PP concerning optimal shoreline slopes and removal of remnant structures.
 - The FS (Section 3.4.5, pg. 3-12) states that the optimal slope for habitat considerations is less than 5H:1V. Most of the existing slopes in the RM11E area are significantly steeper than these slopes, and the space between shoreline structures and navigational areas is very narrow. Accordingly, attainment of the optimal 5H:1V slope laybacks are not only impractical, but physically impossible in several areas and could undermine active, near-shore industrial and commercial infrastructure. During RD, evaluation must include how or whether slopes in the RM11E area could be laid back, and in those areas where it may be possible, assess whether it can be accomplished without impairing upland structures, navigational access, or both (ISR Section 10.2.7.)
 - Remnant structures at RM11E, including large areas of remnant piling, were evaluated in the RM11E ISR (see ISR Figure 9.3). The study concluded that these remnant structures may be stabilizing otherwise over-steepened slopes, in part because they are driven into deeper, stable subsurface materials. Notably, the PP presumes Sitewide that all remnant structures will be removed (PP page 36). Accordingly, application of the PP to remnant structures at RM11E could cause significant unanticipated shoreline and upland slope failure that could threaten health and safety and adversely affect waterfront businesses (ISR Section 10.2.5)

These two examples relate to nearshore mudline/bank slopes and stability (ISR Section 10.2.8). While the FS partially addresses these issues in Section 3.4 and Figure 3.4-22, they are wholly absent from the technology assignment decision trees in PP Figures 10a-10d. The ROD should acknowledge that site-specific implementability considerations, such as slope and stability challenges, may prevent application of the conceptual presumptive remedies, and the ROD should allow for adjustments in technology selection to address such site factors in specific sub-areas.

- Active Commercial Use of the River Requires Consideration in Selecting Remedial Options at RM11E. The PP discusses remedial options that will be conceptually applicable to areas affected by navigation (i.e., the navigation channel, FMD, and areas subject to potential propeller wash). The RM11E ISR found that several hundred vessels (ocean going ships, tug boats, and barges) use or traverse the RM11E area every year, with vessels using over-water RM11E facilities almost every day (see ISR Figure 9.1). The ROD should acknowledge these constraints and indicate that the type of RAs selected, production rates, seasonal timing,

costs, and other factors will need to be specifically adjusted during RD to account for operational site factors, reduce facility closures, and avoid adverse economic impacts to waterfront businesses (ISR Section 10.2.1).

A major objective of the RM11E Supplemental RI/FS was to collect data to inform the selection of a remedy. As illustrated above, these pre-engineering assessments, along with other site-specific information that will be generated in RD, will be critical for selecting and designing an effective and implementable remedy at specific locations within RM11E. Without consideration of critical site factors that will affect implementability, the evaluation of alternatives does not reflect the scope and complexity of site problems being addressed (40 C.F.R. §300.430(a)(1)(ii)(C), §300.430(e)(1) and §300.430(e)(9)(iii)). Additionally, failing to account for these site factors in remedy selection could result in substantial errors in estimates of the cost and duration of RA.

2. The Remedy Selection Process Must Provide for Flexibility in Technology Selection and Implementation

Because the Sitewide FS covers approximately 10 miles of the Willamette River (RM 1.9 to 11.8), EPA broadly applies remedial technologies on a "conceptual" basis throughout the site based on the existing RI dataset. EPA's recognition in the FS that the various remedial alternatives are "conceptual," rather than prescriptive, is therefore very important. For example, we appreciate the note on FS Figure 3.8-9f that states that "Technology assignments are conceptual for FS evaluation purposes and assignments will be refined during RD." The RM11E Group encourages the EPA to emphasize this critical point in the ROD by expressly allowing flexibility at specific locations to modify, as necessary, application of the selected remedial technologies, and to take into account existing and newly generated information including the implementability considerations identified at these specific locations.

EPA's FS and PP use decision trees to assign technologies based on generic sets of conditions. The FS' cost estimates are, in turn, based on these technology assignments. As discussed in Section 1 and Section 4, the results of the RM11E ISR indicate that some conceptual technology assignments in the Sitewide FS would not be feasible in parts of the RM11E area. Actual technology assignment and design for each specific area/subarea of the PHSS will need to address site-specific factors, such as those identified by the RM11E Group. The remedy selected in the ROD should therefore anticipate this need for flexibility and incorporate specific language allowing flexibility during the RD process to consider and implement alternative technology assignments to more effectively address site-specific factors. Additionally, EPA should retain sufficient flexibility to allow for evaluation of emerging technologies, including in-situ options, for areas such as RM11E.

The ROD should provide flexibility in making technology assignments beyond the limited "decision tree" options identified in the PP where site-specific conditions so require. Otherwise, the remedial work will likely be delayed by the need to pursue Explanation of Significant Differences (ESDs) or ROD amendments for areas not well suited for the conceptual technology assignments presented in the FS and PP.

3. Data Collected as Part of the Supplemental RI/FS Must Be Used When Selecting a Remedy

Exclusion of the Supplemental RI/FS data from RM11E means that contamination footprints presented in the FS do not depict current conditions in the RM11E area. A summary of the RM11E investigations and notes on which data were included by EPA in the Sitewide RI/FS are provided in the attached Table 1. As shown in Table 1, EPA opted not to include most of these RM11E data in the Sitewide PP/FS based on time constraints. The lack of incorporation of these data and reliance on out-of-date footprints as the basis for applying remedial technologies in the FS and PP ensures that the remedial options selected will be inconsistent with actual conditions at RM11E, which in turn will adversely affect the accuracy of cost estimates, and could delay implementation of the remedy. The excluded data and examples of how they change FS and PP considerations are summarized below.

The Supplemental RI/FS data needs were identified in the RM11E Statement of Work to fill pre-RD data gaps. The excluded data shown in Table 1 are from:

- Extensive sampling along the riverbank that directly affect remedy selection in this challenging part of the RM11E area.
- Additional surface sediment samples that increase data density and provide updated bounding of the remedial action level (RAL) footprints.
- Analysis of sediment samples for organochlorine pesticide using a more accurate analysis method⁵ that demonstrates many of the pesticide detections in the RI were significantly overestimated.
- Re-occupied surface sediment samples at 15 locations, the results of which demonstrate that concentrations of total PCBs have decreased in more than 70 percent of the re-occupied pairs⁶ (Figure 1).
- New high-resolution bathymetry data that provide a more complete understanding of shoreline features and the potential for Monitored Natural Recovery.

As stated in the December 5, 2014 letter to the EPA and the October 2015 letter to the Boards, the RM11E Group requests that EPA include these EPA-required and EPA-approved data in the Sitewide RI/FS database. EPA's failure to include the new data in the FS and PP has resulted in

⁵ The conventional GC/ECD method (EPA 8081A) is subject to interferences when compounds such as polychlorinated biphenyls (PCBs) and other non-target compounds are present. Samples were re-analyzed using the high-resolution gas chromatography/tandem mass spectrometry (GC/MS/MS) method (EPA 1699M) to more accurately measure pesticide concentrations.

⁶ Note that the sample (SS-097-11252014) in Figure 1 that has the most significant increase in PCB concentrations was not collected as part of the RM11E RI/FS work. The sample was collected by a third party in 2014 (Kleinfelder, 2015) and the RM11E Group has concerns about the comparability of that data to existing sediment data. In particular, the new sample was collected approximately 28 feet from the previous sample RM11E-G029, which was collected in 2009. In addition, the 2014 sample was collected from the upper approximately 10 cm of sediment whereas 2009 sample was collected from the upper 19 cm, and the grain-size results indicate that the 2009 sample had a higher percentage of gravel (20 percent) than the 2014 sample (4 percent). For these reasons, caution should be used when comparing the results of these distinct sampling events.

an inadequate and incomplete depiction of current conditions that undermines the ability to accurately evaluate alternative remedies and resulting risk reductions at RM11E.

4. Attainable PRGs Must Be Set and Exit Strategies Defined

EPA's 2005 Sediment Remediation Guidance (EPA, 2005) emphasizes the need to set cleanup levels that are (1) achievable from site remediation alone, and (2) clearly tied to risk management goals, including definitive end points and exposure scales. The PP fails to demonstrate that the PRGs are attainable and does not clearly define how progress toward and compliance with PRGs will be evaluated. We encourage EPA to consider the following comments when clarifying these points during development of the ROD.

- a. **Background values should be established for all contaminants of concern (COCs) in all media and PRGs should not be set below natural and anthropogenic background numbers.**

EPA does not provide background values for all media (e.g., surface water and fish tissue) or all COCs in sediment (e.g., Aldrin and Dieldrin), and thus, it is unclear whether the PP's risk-based or applicable or relevant and appropriate requirements (ARAR)-based PRGs are attainable and appropriate when considering recontamination potential and remedy effectiveness. As stated in the PHSS RI Report, "Site-specific background concentrations are needed as a means to distinguish site-related contamination from non-site-related chemical concentrations, as well as for developing remedial goals, and for characterizing risk from contaminants that may also be attributed to background sources." As a matter of policy, EPA appropriately defaults to the background concentrations as the sediment PRG if background concentrations are higher than the risk-based or ARAR-based PRGs. Nevertheless, the FS and PP state that there are insufficient data from which to compute defensible background concentrations in other media (FS Section 2.2.2.4, page 2-12; PP Page 24).

The lack of defined background values is a significant data gap that prevents EPA from being able to select a remedy that is achievable. EPA should establish background concentrations for all applicable COCs in all media, and PRGs should not be set below natural or anthropogenic background numbers. When background concentrations are not considered, PRGs can be set at unrealistic values that would result in remedy "failure," such as the following examples, taken from PRG values presented in Table 11 of the PP:

- The surface water PRG is set at a value of 6.4 picograms per liter (pg/L) for Total PCBs based on the Oregon State Water Quality Criteria (WQC) for human health (water +organism). While EPA did not calculate background concentrations in surface water, the surface water concentrations observed in the Round 3A upstream reference transect (from RM 15.9) ranged from 20.9 to 132 pg/L, indicating that the ARAR-based PRG is not attainable because it is below concentrations observed in the background reference area. Similarly, the Dioxin/Furan 2,3,7,8-TCDD eq concentrations in the reference transect had concentrations as high as 0.075 pg/L, which is greater than the proposed surface water PRG of 0.0005 pg/L. The PP confirms that "on a Sitewide scale, none of the alternatives

achieve surface water PRGs for PCBs and 2,3,7,8-TCDD eq.” This issue also applies to other COCs, indicating that many of the risk-based and ARAR-based surface water PRGs are unattainable and background values need to be established for surface water in order to set achievable PRGs.

- Some of the groundwater PRGs, especially those provided for metals, are set at levels that are below regional groundwater concentrations. For example, the Oregon Department of Environmental Quality (DEQ) uses a default background concentration for arsenic in freshwater of 2 ug/L⁷, which is two orders of magnitude greater than the groundwater PRG of 0.018 ug/L (PP Table 11).
- The PRG assigned to Total PCBs in fish tissue is 0.25 micrograms per kilogram (µg/kg). To our knowledge, there are no fish in the Pacific Northwest that achieve this level of PCBs, even at what are considered background locations⁸. This is also true for the Willamette River where the PCB levels in fish from RM 16 to 18 collected by the Lower Willamette Group (LWG) under EPA supervision in 2012 were all more than 100 µg/kg.

Even for COCs where background numbers have been established and utilized in the PRG selection process, some background PRGs appear to be set at levels that do not adequately account for anthropogenic background, and, therefore, will be unattainable. EPA should consider using other lines of evidence, such as incoming suspended solids and sediment concentrations in the Downtown Reach, to establish realistic PRGs for the following chemicals in sediment:

- 1,2,3,4,7,8-hexachlorodibenzofuran (HxCDF)
- 1,2,3,7,8-pentachlorodibenzo-p-dioxin (PeCDD)
- 2,3,4,7,8-pentachlorodibenzofuran (PeCDF)
- 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
- Mercury
- Arsenic

Additionally, the bank soil screening value of 12 µg/kg for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) is inappropriately applied to sediment in Table 11 of the PP. As per Table 2.2-4 of the FS, the risk-based ARAR value of 106 µg/kg for cPAHs should be used as the sediment PRG in the ROD.

Currently, the background concentrations are not based on sediment concentrations immediately upstream of the site, but rather 4 miles upstream of the site. We understand that existing data immediately upstream of the site was not chosen for background concentrations given the number of upstream sediment remedies that have recently been or will be implemented during the next several years. However, additional sediment and surface water data at the upstream

⁷ Default background concentrations metals provided in an Internal DEQ Memorandum to the DEQ Project Managers on October 28, 2002.

⁸ See “Oregon Toxics Monitoring Program, Willamette River Basin Year One (2008) Summary Report” (DEQ, 2009), and “Background Characterization for Metals and Organic Compounds in Northeast Washington Lakes” (State of Washington Dep of Ecology, 2011).

boundary of the site (RM 11.8) should be collected during baseline monitoring, after the upstream remedies have been completed, to obtain a more accurate measure of background and potentially revise the PRGs to allow for an attainable remedy.

Remedial goals based on unrealistic expectations are misleading and do not provide for proper risk management. If appropriate background concentrations are not provided for all media and applicable COCs, EPA should at a minimum describe the process by which attainability and remedy effectiveness will be evaluated and how/when these PRGs will be updated to attainable numbers. Because RM11E is the uppermost SDU within the PHSS and the PHSS is situated at the base of a large, primarily developed, watershed, the RM11E Group cannot be held responsible for upstream contributions that have the potential to recontaminate the RM11E area post remedy implementation. By extension, the respondents at RM11E cannot be held responsible for attainment of unrealistic PRGs that are set below the concentrations entering the PHSS at RM 11.8.

b. PRGs should be clearly tied to risk management goals, including definitive end points and exposure scales.

EPA states that the long-term monitoring program will include sediment, surface water, porewater, and fish tissue samples, but does not clearly define the remedial action objectives (RAOs) and the associated monitoring endpoints. It needs to be stated clearly that each RAO is tied to a specific question to be answered about the resource at risk. Clear objectives are critical because the long-term monitoring program will be designed to verify achievement of or progress toward those RAOs. For example, it is not clear how background-based PRGs, such as the total PCB sediment PRG of 9 µg/kg, will be evaluated post-construction. It is also unclear whether performance will be evaluated on a Sitewide surface-weighted average concentration (SWAC) or a rolling RM basis, and whether the PCB PRG will be evaluated with Aroclor or congener data. Similarly, the spatial scale that will be used to evaluate the various risk-based PRGs, such as the mercury PRG of 0.085 milligram per kilogram (mg/kg), is not defined. The ROD should provide a clear risk management framework to support the RAOs and identify specifically how attainment of PRGs will be evaluated temporally and spatially. Clear exit criteria should also be established and strategies for modifying PRGs and/or the monitoring program should be discussed.

5. Cost Estimates Are Unjustifiably Low and Must Be Updated

The FS and PP rely on qualitative analyses and overly optimistic assumptions that underestimate Sitewide costs and favor dredging remedies by making them appear more cost-effective relative to other remedies. Because the FS and PP do not provide costs associated with each Sediment Decision Unit (SDU), it is not possible to evaluate the accuracy of those cost estimates across different parts of the site where the presence of site factors, such as those described in Sections 1 and 2 above, complicate the use of prescriptive remedial technologies that will likely result in added costs. Several examples of areas where costs are underestimated are described below. The RM11E Group encourages EPA to consider these issues and use a more realistic estimate of cost

and duration in remedy selection and issuance of the ROD.

Administrative Processes and Cost Assumptions

- The 7 percent discount rate that is used in the FS and PP does not account for inflation and depreciation, and is high relative to the 2.3 percent discount rate that was used in the Final Feasibility Study for the Lower Duwamish⁹.
- The 20 percent contingency is on the low end of the recommended range in EPA 540-R-00-002 and is not appropriate for a site as large and complex as PHSS. (FS Appendix G, Table CS-I, page 3.)
- The remedy cost estimate includes Project management at 2 percent, RD at 2 percent, and construction management at 3 percent of the overall remedy cost. Again, for a site as large and complex as PHSS, these estimates are too low (e.g., for RD for Alternative I, this equates to \$14 million for the entire Site).
- Significant costs apparently excluded from EPA's estimate include:
 - EPA/Tribal oversight
 - Baseline sampling costs
 - Relocation, protection, or alteration of critical utilities and structures

Remedy Implementation

- **Lack of Consideration of RM11E Site Factors:** As documented in the RM11E ISR, slope and structural stability issues in the nearshore area will pose significant design and construction challenges. As noted, site conditions will require flexibility in technology assignment to allow the selection of implementable and effective remediation technologies. Site conditions such as those at RM11E will also likely result in design and remedy implementation costs that may be significantly different than the generic cost estimate contained in the FS and PP. EPA's cost estimates do not appear to address conditions such as those presented at RM11E.

First, EPA's RD estimate (2 percent of construction costs – see FS at Appendix G) is already lower than EPA guidance, leaving no room for addressing the design challenges presented in areas like RM11E. Second, EPA's remedial construction costs do not appear to include costs for slope or structural stabilization measures as may be required in areas such as RM11E (see, e.g., FS Appendix D, and Appendix G at Table CS-I and accompanying worksheets). For these reasons, EPA's cost estimates should be revised to more accurately reflect the design and construction costs associated with slope and structural stability challenges in PHSS.

- **Overestimated Dredging Rates:** EPA's assumed dredge rate of 5,000 to 6,000 cubic yards per day (CY/day; FS Appendix D page D-5 [5,000 CY/day], Table D2.c [5,100 CY/day], and Table D3-1 Assumption 2 [6,000 CY/day]) is unrealistically high for the many areas of PHSS that will require more precise removal around shoreline facilities

⁹ See FS Appendix I, page 1-5; Final Feasibility Study, Lower Duwamish Waterway Group (October 31, 2012).

and consideration of localized site factors, such as those described in Sections 1 and 2. In addition, in comparison to sites with less complex shoreline considerations, such as the Lower Fox River OU4A (where production rates are approximately 3,500 CY/day using three working dredges), the dredge cuts are relatively thin in most parts of PHSS and spread over discontinuous and large areas so barges /dredge plants will need to move numerous times before the barge is filled to capacity.

The availability of local contractors, dredging equipment (e.g., “Super Jumbo Barges”; FS Appendix D Table D2.o., page 28), and materials (e.g., sand for sand caps) could also be a limiting factor in the remedy implementation schedule and should be considered in duration and cost estimates, especially given that the Lower Duwamish cleanup may be occurring at the same time as the PHSS cleanup. As the demand rises in Portland and Seattle, resources may need to be sourced from greater distances, thus increasing the overall cost of the remedy in the PHSS. We believe the 7-year timeframe assumed for Alternative I implementation is overly optimistic given the dredging duration considerations noted above.

- **Unclear Sand Cap Placement, Confirmation Sampling, and Water Quality Monitoring Requirements**

The PP proposes placing a 12-inch sand cover “daily in all dredge areas.” It is unclear if this sand cover represents the final residual cover, and if EPA will require post-dredge confirmation sampling prior to sand placement. If confirmation sampling is required and lab results indicate RALs have not been achieved, the time for clean-up pass dredging will need to be added to the overall schedule, further reducing dredge production rates. Daily placement of sand cover over small areas is very inefficient and it does not appear that the FS or PP have adequately estimated or priced sand placement production rates and post-dredge confirmation sampling protocols. Additionally, EPA should clarify the scope of water quality monitoring requirements during dredging and ensure that those activities are accounted for in the engineering controls and dredging production rates and associated cost estimates.

Waste Determination and Disposal

- **In-Situ vs. Ex-Situ Hazardous Waste Determination and Associated Disposal Costs:** The PP anticipates that approximately 192,000 CY of removed materials will need to be managed as hazardous (FS pages ES-15 and 4-33). This volume may be overestimated, and, therefore, we recommend that the ROD allow for ex-situ characterization of waste as has occurred at other sediment sites. Experience at these other sites has demonstrated that ex-situ sampling of dredged material typically results in the removed and dewatered sediments being cleaner than anticipated based on in-situ characterization, and oftentimes allows for nonhazardous disposal in a Subtitle D landfill.

Because of these pervasive flaws in cost assumptions, neither the FS nor PP properly evaluates the overall effectiveness of remedies (40 C.F.R. §300.430(f)(1)(ii)(D)).

6. Sitewide Conceptual Site Model (CSM) Is Oversimplified to the Point of Inaccuracy at RM11E

EPA's CSM is extremely qualitative and does not provide an adequate foundation for a comparative analysis of alternatives and remedy selection at the various locations within the PHSS, such as RM11E. As drafted, the CSM oversimplifies site conditions to the point where it may be contrary to actual site conditions in specific locations, and the CSM becomes inaccurate and unhelpful in choosing RAs appropriate to those locations. The CSM, including the potential for natural recovery, for each particular SDU should be clarified, preferably before or in the ROD. If not, sufficient flexibility needs to be left in the conceptual choice of remedy in the ROD so that remedial choices appropriate to specific SDUs can be made without the need for ROD amendments or ESDs. For RM11E, these refinements to the CSM may require additional time during RD.

7. Administrative Options for RD/RA Implementation Should Be Flexible and Identified

The PHSS is a large and complex Superfund site with multiple areas expected to require active remediation. The PP and FS address some of the challenges presented by the site in their discussions of remedy sequencing (e.g., PP at p. 65 and FS at pp ES-9 and 3-39). However, the PP and FS are silent as to potential administrative tools for efficiently accomplishing active remediation in a dozen or more discrete geographic areas, or for sequencing remedy implementation. The ROD should identify appropriate administrative tools that may be employed to accomplish RD and RA across the site, including potential multiple consent decrees and/or multiple operable units. Additionally, the ROD should clearly identify the administrative tools and processes that will provide needed flexibility in technology selection to account for localized site factors without delaying cleanup by requiring excessive administrative processes. Clear, streamlined administrative processes will be essential for completing remedial efforts efficiently. Failure to identify and allow flexible administrative options could unnecessarily allow the entire PHSS response to be slowed down by the site's most problematic issues. A ROD that allows flexibility in administrative options and conceptual remedy application has the best chance of facilitating timely sequential remedy implementation and also allowing lessons learned in early portions of RD/RA to be useful in later RD/RA activities.

Conclusions

The RM11E Group supports EPA's efforts to identify an effective and implementable RA for the PHSS. Central to that effort is anticipating and allowing potential remedy adjustments that will necessarily be required as additional site-specific information is assembled. Providing an efficient administrative process for making those adjustments within the current planned conceptual ROD is critical. Some adjustments will be driven by new sediment data that will result in refined cleanup footprints. Other adjustments will be driven by site-specific factors, such as sediment and slope stability, infrastructure and facility operations, that may require use of different remedial technologies from those identified under the Sitewide FS's conceptual technology assignment matrices and "decision trees."

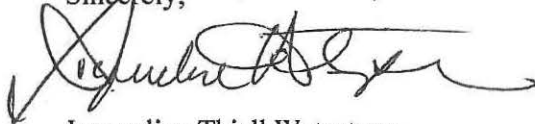
The RM11E Supplemental RI/FS work is an excellent case study of the types of adjustments that are likely to be required at the PHSS as implementation of the ROD occurs during RD/RA. New information on major infrastructure, slope stability and operational considerations will require modification to the presumptive technology assignments in the Sitewide FS and PP. Similarly, new sediment and riverbank data from the RM11E area that are not currently included in the FS data set indicate the need for meaningful changes to the contaminant footprints associated with the RALs established in the Sitewide FS and PP. On both fronts, more information is likely to be generated during RD that will require further adjustments.

To ensure consistency with the NCP, EPA must include the RM11E Supplemental RI/FS data and information, develop attainable PRGs, and prepare realistic cost estimates. This work is needed to provide sound evaluations of the remedy effectiveness and cost-effectiveness consistent with the NCP.

The RM11E Group strongly encourages EPA to consider the insights gained during the Supplemental RI/FS work and to incorporate these comments into the ROD. The ROD should allow for further adjustments to the presumptive remedy to accommodate this type of area specific information and future data that will be developed. Failure to anticipate and allow reasonably foreseeable adjustments to the conceptual remedy would cause unnecessary process and delay, such as generating ESDs or processing ROD amendments. Finally, it is important that the ROD identify flexible administrative tools for moving forward with the RD/RA after the ROD is issued in order to promote successful site response.

The RM11E Group is prepared to discuss the issues addressed above, or to provide any additional information that would be helpful to the EPA as the agency responds to comments on the PP and prepares the ROD.

Sincerely,



Jacqueline Thiell Wetzsteon
On behalf of the RM11E Group:

Cargill, Inc.
CBS Corporation
City of Portland
DIL Trust
Glacier Northwest, Inc.
PacifiCorp

Attachments:

Implementability Study Report, Chapter 10 figures

Table 1: RM11E Data Summary

Figure 1: Total PCB Aroclor Concentrations in Reoccupied Surface Sediment Sample Pairs

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Mr. Jim Woolford, EPA HQ
Mr. Dennis McLerran, EPA Region 10
Ms. Kristine Koch, EPA Region 10
Mr. Sean Sheldrake, EPA Region 10
RM11E AOC Notice Recipients (Paragraph 97.c through m)

Table 1: RM11E Data Summary

Study	Report Name and Publication Year	Sample Matrix	Sample Year	Sample Description	Database "Matrix"	Database "task_code"	Included in LWG Appendix H SCRA and EPA RI Database?	Included in EPA PH RI Figures?	Included in PH FS/PP Sediment Database and Figures?
RM11E	RM11E Focused Sediment Characterization	Surface and Subsurface Sediment Field and Data Report (2009)	2009	60 surface and 50 subsurface sampling locations between RM 11 and 12.1. Mixture of partial and full analyte suite.	SE	RM11E	Yes	No	Yes
		In-River Sediment Trap Field and Data Report (2010)	2009-2010	Third and fourth quarter settleable suspended sediment results for seven sediment traps between RM 11 and 12.1. Full analyte suite on all samples.	SEIRT	RM11E_ST	Yes	No	No
		Bank Soil and Debris Field and Data Report (2010)	2009	23 bank soil locations below ordinary high water (OHW) and the Portland Harbor vertical datum of 13.3 ft NAVD88. Partial analyte suite on all but three samples, which had the full suite run.	SO ¹	RM11E_BD	Yes	No	No ¹
			2009	Seven bank debris samples collected below OHW and the PH vertical datum.	BD	RM11E_BD	No	No	No
	Follow-up analysis on archived samples collected as part of the RM11E Focused Sediment Characterization	Supplemental Data Report: Archived Bank Soil and Sediment Re-Analysis (2013)	2009	Re-Analysis of 4 surface and 6 subsurface sediment samples for high-resolution pesticides by EPA 1699M.	SE	RM11E_Sup	No	No	No
			2009-2010	Re-analysis of the third and fourth quarter sediment trap results from station RM11E- ST003 for high-resolution pesticides by EPA 1699M.	SEIRT	RM11E_ST_Sup	No	No	No
			2009	Remainder of full analyte suite run on the archived bank soil samples noted above in task_code "RM11E_BD"	SO	RM11E_BD_Sup	No	No	No
	Supplemental RI/FS with RM11E Group	Final Supplemental Remedial Investigation/ Feasibility Study Field Sampling and Data Report (2014)	2013-2014	Twenty-two new surface sediment samples collected between RM 10.9 and 11.6.	SE	RM11E_SupRIFS	No	No	No
			2013	Seven top of bank surface soil samples and two collected in the upper part of the Cove, above OHW and the Portland Harbor Vertical Boundary.	SO	RM11E_SupRIFS	No	No	No
			2013	Samples representing the composited fill and upper five feet of native alluvium sampled from the five new monitoring wells.	SO	RM11E_SupRIFS	No	No	No
			2013-2014	Five new monitoring wells and two existing monitoring wells were sampled during two events.	GW	RM11E_SupRIFS	No	No	No
	RM11E Porewater Characterization with RM11E Group	Final Porewater Characterization Report (September 2015)	2014	Six surface sediment samples were collected in conjunction with the Porewater Characterization. These locations targeted (reoccupied) previous RI/FS surface sediment sampling locations.	SE	RM11E_SupRIFS_PW	No	No	No

Notes:

BD = Bank Debris

FS = Feasibility Study

GW = Groundwater

LWG = Lower Willamette Group

PP = Proposed Plan

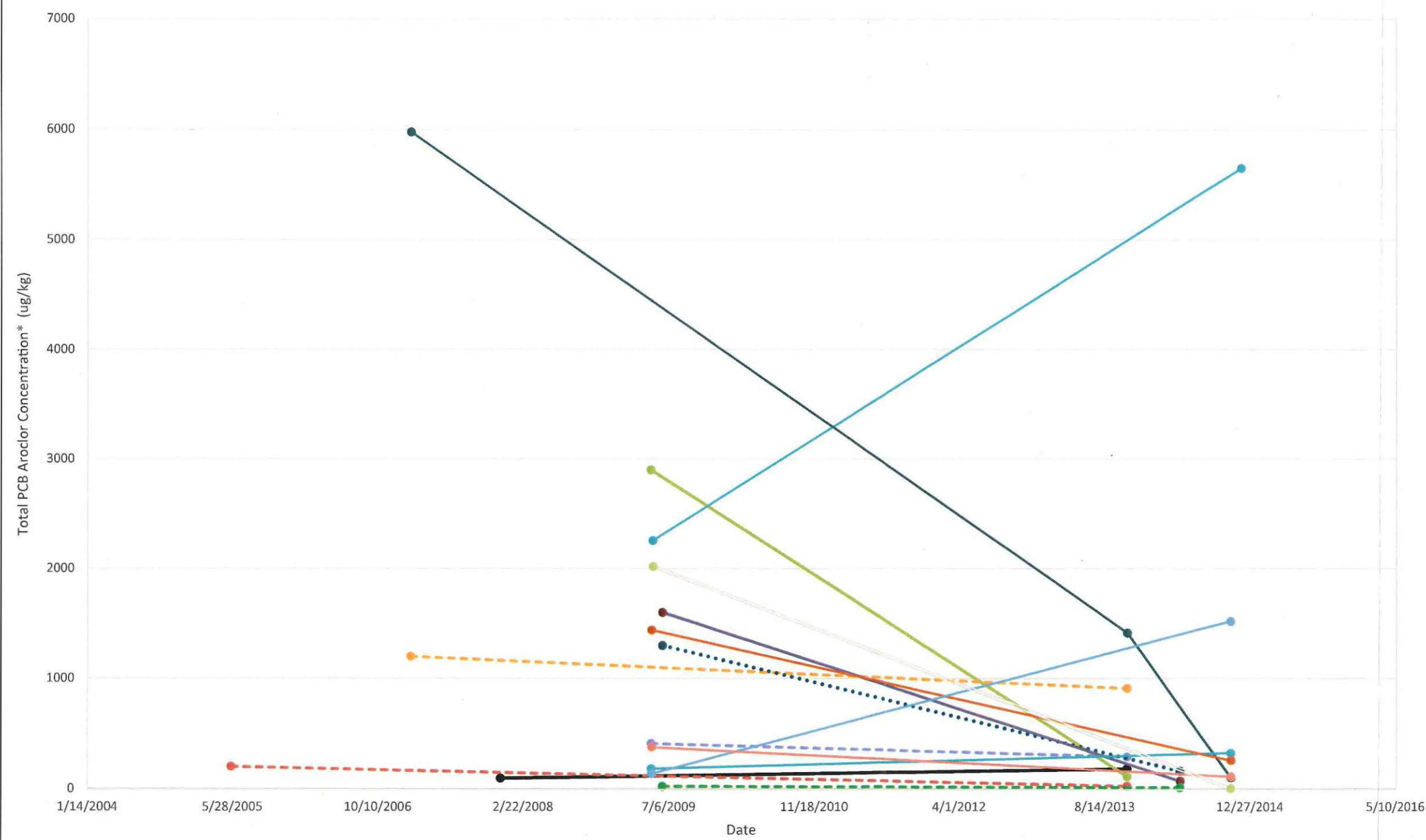
RI = Remedial Investigation

SE = Sediment

SEIRT = Settleable Suspended Sediment (Sediment Traps)

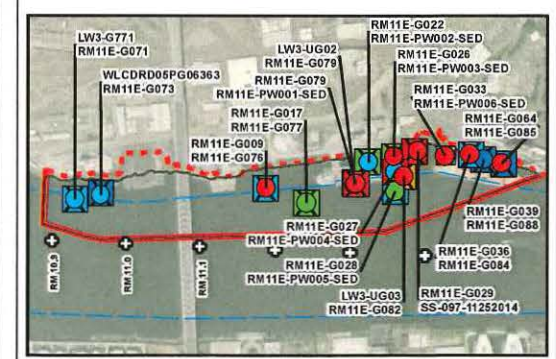
¹ Note that these 23 bank samples, were initially given the matrix code of "SO" for soil, but because they were collected below an elevation of 13 ft. North American Vertical Datum of 1988 (NAVD88), they should be considered sediment (matrix code = SE). That correction was

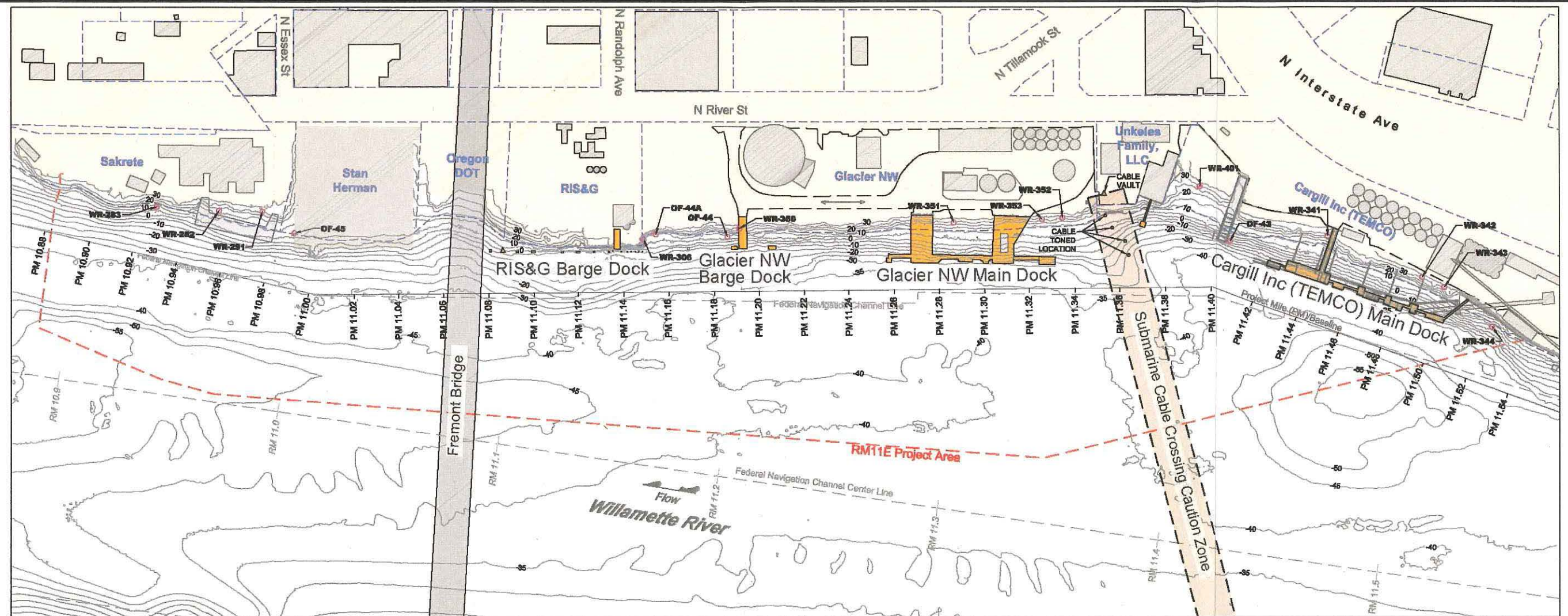
FIGURE 1
Total PCB Aroclor Concentrations
Reoccupied Surface Sediment
Sample Pairs



- LEGEND**
Reoccupied Sample IDs
- LW3-G771 & RM11E-G071
 - - -●- - - WLCDRD05PG06363 & RM11E-G073
 - RM11E-G009 & RM11E-G076
 - RM11E-G017 & RM11E-G077
 - - -●- - - LW3-UG03 & RM11E-G082
 - ...●... RM11E-G036 & RM11E-G084
 - RM11E-G064 & RM11E-G085
 - RM11E-G039 & RM11E-G088
 - RM11E-G029 & SS-097-11252014
 - LW3-UG02 & RM11E-G079 & RM11E-PW001-SED
 - RM11E-G022 & RM11E-PW002-SED
 - RM11E-G026 & RM11E-PW003-SED
 - RM11E-G027 & RM11E-PW004-SED
 - RM11E-G028 & RM11E-PW005-SED
 - RM11E-G033 & RM11E-PW006-SED

Note that the sample (SS-097-11252014) in Figure 1 that has the most significant increase in PCB concentrations was not collected as part of the RM11E RI/FS work. The sample was collected by a third party in 2014 (Kleinfelder, 2015) and the RM11E Group has concerns about the comparability of that data to existing sediment data. In particular, the new sample was collected approximately 28 feet from the previous sample RM11E-G029, which was collected in 2009. In addition, the 2014 sample was collected from the upper approximately 10 cm of sediment whereas 2009 sample was collected from the upper 19 cm, and the grain-size results indicate that the 2009 sample had a higher percentage of gravel (20 percent) than the 2014 sample (4 percent). For these reasons, caution should be used when comparing the results of these distinct sampling events.





MAP NOTES

1. The locations of all features shown are approximate.
2. Contour lines and planimetric features are based on a composite data set which consists of the following: NOAA multibeam survey from 2009; ODSL multibeam and laser survey from 2010; USACE LIDAR survey from 2009; David Evans and Associates, Inc. multibeam survey from 2011 and terrestrial laser scan from 2013; and RLIS Metro GIS data. Digital elevation model (DEM) surface for bathymetric contours was modeled only in the immediate vicinity of the RM11E Project Area. It is not intended for litigation, construction, or navigation purposes.
3. Horizontal datum is based on Oregon State Plane North NAD83 (international feet). Vertical datum is referenced to NAVD88 (feet).
4. Outfall status and location from City of Portland - Bureau of Environmental Services (BES) GIS group in June 2013. Data layer acquired from GSI. Outfalls centered on coordinates from BES data layer.
5. Tax lot boundary generated by METRO (Oct. 2013). Data layer acquired from GSI.
6. Vertical pile remnants and submarine cable crossing toned location provided by David Evans and Associates, Inc. as described in the Draft Implementability Study Report, Section 2.

LEGEND

- Active Docks (2015)
- Existing Structures
- Submarine Cable Crossing Caution Zone
- Outfall - Active
- Outfall - Inactive or Status Unknown
- RM11E Project Area
- Tax Lot Boundary (Oct. 2013)
- River Mile Stationing (USACE)
- Project Mile Stationing
- Federal Navigation Channel (USACE)
- Bathymetric Contour - 5' Interval (NAVD88)



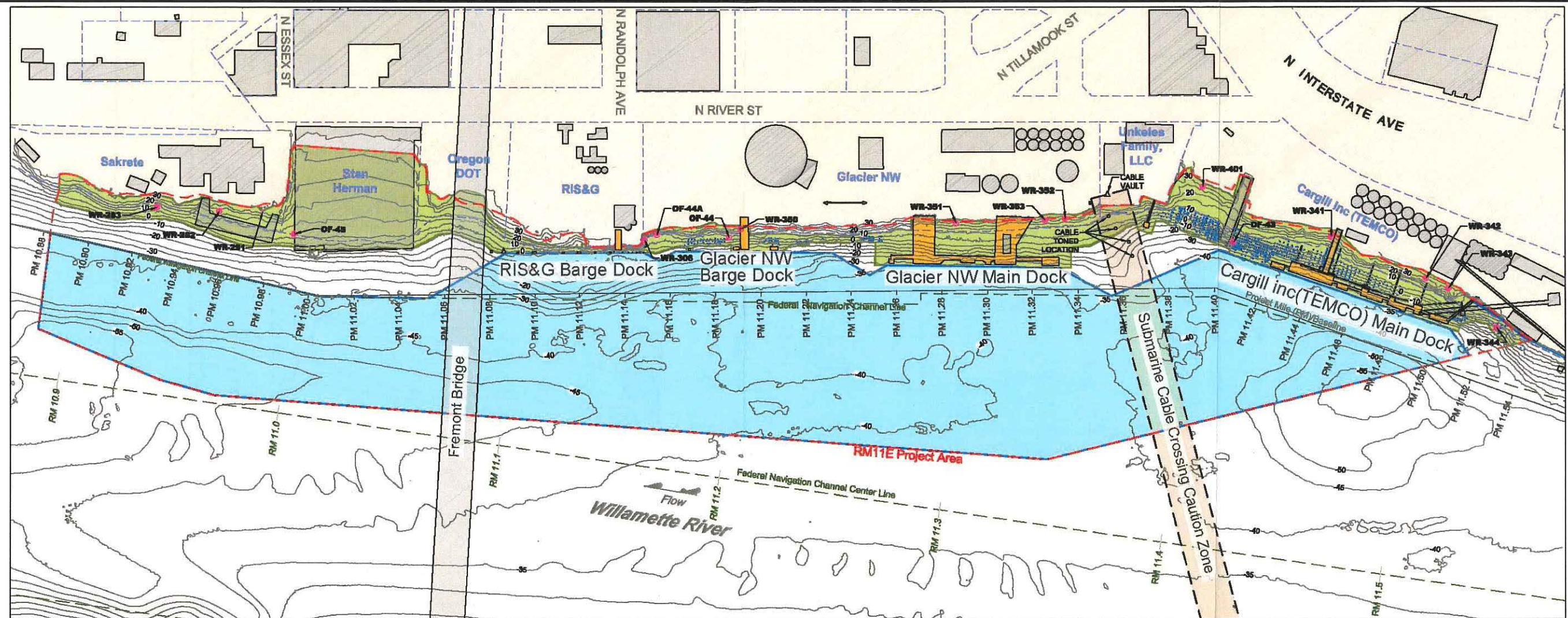
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Waterfront Facilities

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Figure
9.1

July 31, 2015



MAP NOTES

1. The locations of all features shown are approximate.
2. Contour lines and planimetric features are based on a composite data set which consists of the following: NOAA multibeam survey from 2009; ODSL multibeam and laser survey from 2010; USACE LiDAR survey from 2009; David Evans and Associates, Inc. multibeam survey from 2011 and terrestrial laser scan from 2013; and RLIS Metro GIS data. Digital elevation model (DEM) surface for bathymetric contours was modeled only in the immediate vicinity of the RM11E Project Area. It is not intended for litigation, construction, or navigation purposes.
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6. Vertical pile remnants and submarine cable crossing toned location provided by David Evans and Associates, Inc. as described in the Draft Implementability Study Report, Section 2.

LEGEND

High-Impact Ranking

- Construction Access: High-Impact
- Navigation Clearance/Facility Operations: Moderate- to High-Impact (Cap/Cover)
- Submarine Cable Crossing Caution Zone: High-Impact
- Outfall - Active: Moderate-Impact
- Outfall - Inactive or Status Unknown: Moderate-Impact

Other Features

- Active Docks (2015)
- Existing Structures
- Submarine Cable Crossing Caution Zone
- RM11E Project Area
- Tax Lot Boundary (Oct. 2013)
- River Mile Stationing (USACE)
- Project Mile Stationing
- Federal Navigation Channel (USACE)
- Bathymetric Contour - 5' Interval (NAVD88)



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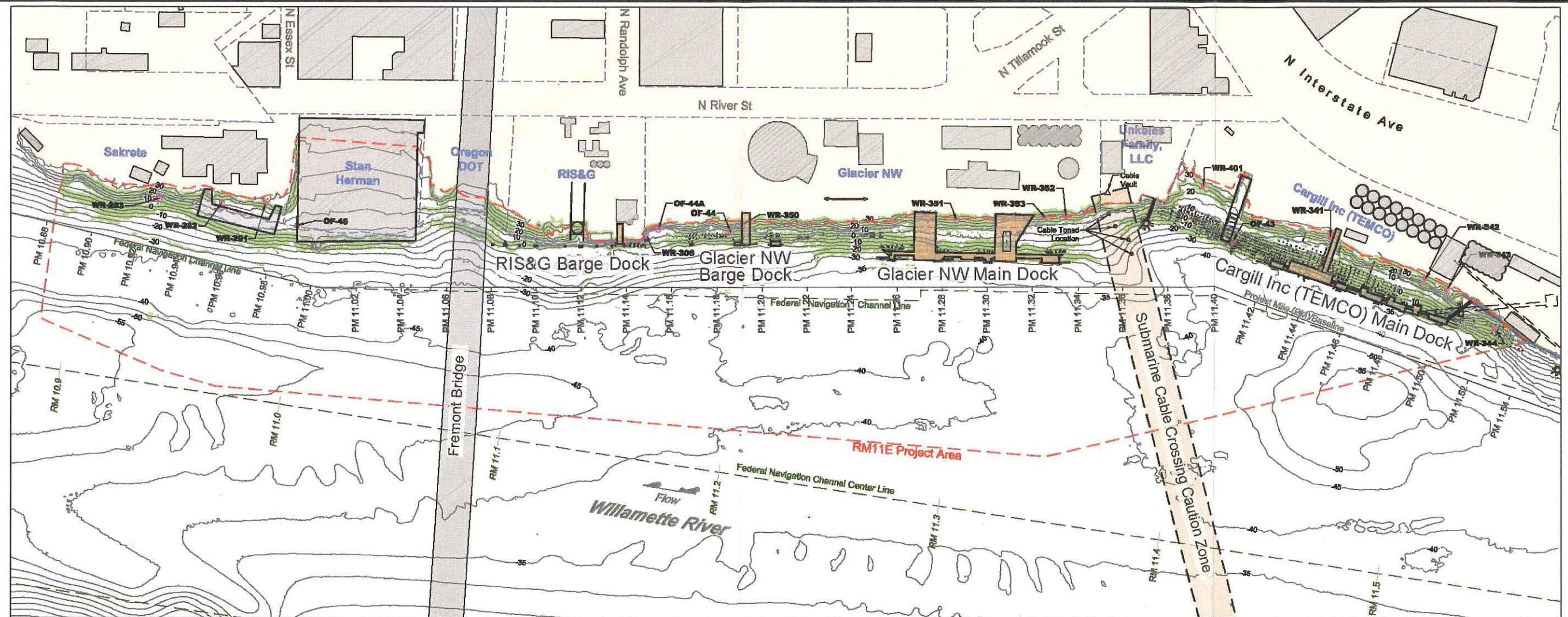
Waterfront Use High-Impact Ranked Areas

(See Figures 3.16a through 3.16d for details)

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Figure 9.2

July 31, 2015



MAP NOTES

1. Slope analysis performed by GSI Water Solutions, Inc., September 2014, using ESRI ArcGIS to analyze the DEA Existing Grade composite project surface (DEM) for changes in slope.
2. The locations of all features shown are approximate.
3. Contour lines and planimetric features are based on a composite data set which consists of the following: NOAA multibeam survey from 2009; ODSL multibeam and laser survey from 2010; USACE LiDAR survey from 2009; David Evans and Associates, Inc. multibeam survey from 2011 and terrestrial laser scan from 2013; and RLIS Metro GIS data. Digital elevation model (DEM) surface for bathymetric contours was modeled only in the immediate vicinity of the RM11E Project Area. It is not intended for litigation, construction, or navigation purposes.
4. Horizontal datum is referenced to Oregon State Plane North NAD83 (international feet). Vertical datum is referenced to NAVD88 (feet).
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6. Tax lot boundary generated by METRO (Oct. 2013). Data layer acquired from GSI.
7. Vertical pile remnants and submarine cable crossing toned location provided by David Evans and Associates, Inc. as described in the Draft Implementability Study Report, Section 2.

LEGEND

High-Impact Ranking

Oversteepened Slopes (Slopes Steeper than 2H:1V): High-Impact

Other Features

Active Docks (2015)

Existing Structures

Submarine Cable Crossing Caution Zone

○ Outfall - Active

○ Outfall - Inactive or Status Unknown

--- RM11E Project Area

--- Tax Lot Boundary (Oct. 2013)

--- RM 11.3 River Mile Stationing (USACE)

--- PM 11.32 Project Mile Stationing

--- Federal Navigation Channel (USACE)

--- Bathymetric Contour - 5' Interval (NAVD88)



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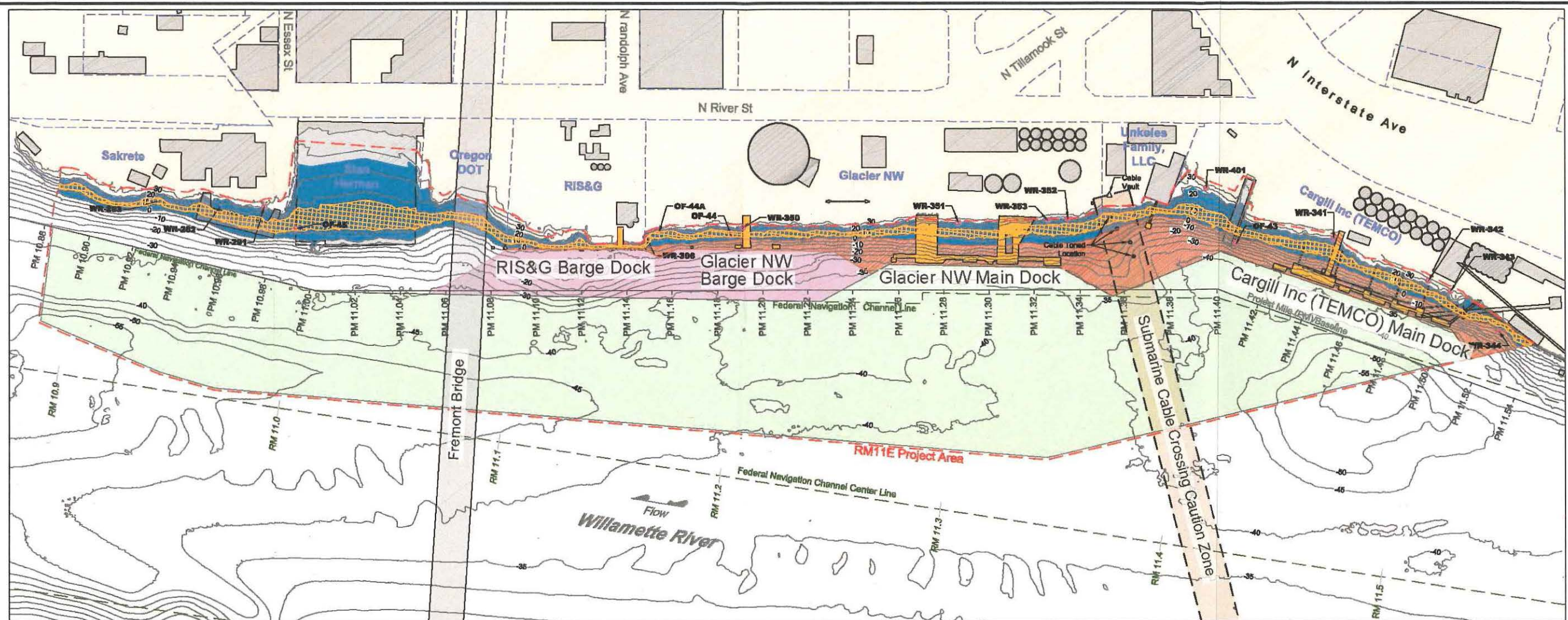
Geotechnical High-Impact Ranked Areas

(See Figures 5.6a through 5.6d for details)

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Figure 9.4

July 31, 2015



MAP NOTES

1. Majority of wave force 6' to 13' NAVD88 (Anchor et. al., 2012).
2. The locations of all features shown are approximate.
3. Contour lines and planimetric features are based on a composite data set which consists of the following: NOAA multibeam survey from 2009; ODSL multibeam and laser survey from 2010; USACE LiDAR survey from 2009; David Evans and Associates, Inc. multibeam survey from 2011 and terrestrial laser scan from 2013; and RLIS Metro GIS data. Digital elevation model (DEM) surface for bathymetric contours was modeled only in the immediate vicinity of the RM11E Project Area. It is not intended for litigation, construction, or navigation purposes.
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7. Vertical pile remnants and submarine cable crossing toned location provided by David Evans and Associates, Inc. as described in the Draft Implementability Study Report, Section 2.

LEGEND

High-Impact Ranking

- Wave Zone (0.0' to 23.3'): Moderate- to High-Impact (Cap/Cover)
- Majority of Wave Force (6.0' to 13.0'): High-Impact (Cap/Cover)
- Shallow Draft Propeller Wash: Moderate- to High-Impact (Cap/Cover)
- Deep Draft Propeller Wash: Moderate- to High-Impact (Cap/Cover)
- Adjacent Shoreline Propeller Wash: Moderate- to High-Impact (Cap/Cover)

Other Features

- Active Docks (2015)
- Existing Structures
- Submarine Cable Crossing Caution Zone
- Outfall - Active
- Outfall - Inactive or Status Unknown
- RM11E Project Area
- Tax Lot Boundary (Oct. 2013)
- River Mile Stationing (USACE)
- Project Mile Stationing
- Federal Navigation Channel
- Bathymetric Contour - 5' Interval



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Hydrodynamics High-Impact Ranked Areas
 (See Figures 7.7a through 7.7d for details)

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Figure 9.5
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